

REMARKS

The Applicant thanks the Examiner for the thorough consideration given the present application. Claims 1-12 are currently being prosecuted. The Examiner is respectfully requested to reconsider his rejections in view of the amendments and remarks as set forth below.

Rejection under 35 U.S.C. § 103

Claims 1-6, 8 and 9 stand rejected under 35 U.S.C. § 103 as being obvious over Iijima (U.S. Patent No. 5,661,357) in view of Gakenholz (U.S. Patent No. 5,023,532). This rejection is respectfully traversed.

The Examiner points out that Iijima shows an end cap assembly for an electric motor with an outer part supporting a bearing and motor terminals and inner part having a first brush cage and a second brush cage separated by 180°. The Examiner admits that Iijima fails to show a provision for locating a third and fourth brush cage at desired locations which are in between the first and second brush cages. Applicants disagree with the Examiner's understanding of this reference.

First, it is not understood how the Examiner differentiates between the outer part and the inner part of the end cap assembly. Both parts noted by the Examiner appear to be the same and not

separate parts as in the present invention. Further, the Applicant disagrees with the Examiner that the outer part has motor terminals. In addition, this device differs from the present invention in that it does not show a two-part end cap assembly, but rather, is a single molded assembly.

The Examiner relies on Gakenholz to show a third and fourth brush cage at a desired location circumferential between first and second brush cages. The Examiner also states that this is for the purpose of controlling different directions for rotation. The Examiner feels it would have been obvious to one of ordinary skill in the art to modify Iijima by providing a provision for a third and fourth brush cage at a location circumferential between the first and second brush cages to control the different directions for rotation. Applicants disagree with the Examiner's understanding of the Gakenholz reference also.

First, the Applicant disagrees that the presence of a brush case is inherent. Many brushes, such as hammer brushes or leaf brushes do have a brush cage or brush box. Also, it is very clear that the third and fourth brushes of Gakenholz are not for direction control, but to improve the torque of the motor at high speed. Thus, brushes 14 and 15 are joined in parallel and thus cannot be used for different directions. Further, the Applicant has reviewed column 2, lines 5-10 and see no indication that the

brushes are used to control different directions of rotation. While it may be possible for the direction of the motor in Gakenholz to be reversed, such as by reversing the polarity of the power supply, it would not be caused by the third and fourth brushes. Also, it is noted that this reference does not show a specific construction of brush cases or other apparatus, but rather only shows an abstract circuit diagram of the motor control arrangement. Accordingly, the Applicant submits that this reference does not show the parts of the claimed invention as suggested by the Examiner.

Furthermore, the Applicant submits that even the combination of these two references still does not teach the present claimed invention. Neither reference teaches a two part end cap assembly having two first cages with the provisions for providing third and fourth brush cages at desired locations therebetween. Further, the Applicant has now amended claim 1 to bring out many of the features of the present invention. The provision for the third and fourth brush cages are now described as "selectively for locating" to make it clear that these two brush cages can be included or not as desired during the assembly of the device. A whereby clause has also been added to further emphasize this point. One of the important features of the present invention is that the end cap assembly can be used for different types of motors and by adding the third or fourth brush cage. The basic device has two brush

cages and can be used for a single speed motor. A third brush cage can be added for a two speed motor and a fourth brush cage can be added for a two-speed bi-directional motor. In a manufacturing situation, the ability to use a single part for three different models saves time and money in the assembly process. This concept is not seen in any of the references suggested by the Examiner. That is, all of the references deal with a fixed arrangement of brushes and do not teach the concept of variable members of brushes on the same apparatus in order to be used with different models. Accordingly, the Applicant submits that claim 1 is allowable over this combination of references.

Claims 2-9 depend from claim 1 and as such are also considered to be allowable. In addition, these claims have other features of the invention, many of which are not shown in the references. For example, claim 3 describes the specific position of the third and fourth brush cages as being spaced between 75 and 90°. The Examiner feels that it would have been obvious to include this range of degrees. However, the Applicant submits that the selection of these particular angles is a positive feature not taught by the references. Accordingly, the Applicant submits that claim 3 is additionally allowable.

Claim 6 specifically describes the detent which locates the third and fourth brush cages at the proper radial distance. The

Examiner relies on Gakenholz to show this feature and refers to the attaching means to hold the brush holder to collector 11. In fact, this collector is nothing more than a commutator against which the brushes rub and which is separated from the brush holders. Thus, this collector or commutator cannot be used as a detent.

In regard to claims 8 and 9, the Examiner states the Iijima shows noise suppression components and refers to chokes 47 and shunts 53. In fact, item 47 is nothing more than a screw to hold the electrodes together. Thus no electrical noise suppression components are shown.

Claim 7 stands rejected under 35 U.S.C. § 103 as being obvious over Iijima in view of Gakenholz and further in view of Gilchrist. The Examiner cites Gilchrist to show a detent means with projections in the form of bolts 30 and 31 which engage arcuate grooves 25 to set the radial distance. The Applicant disagrees with the Examiner's application of this reference. While one of the brushes is positionable within a limited circumferential range, this is accomplished by means of a nut and bolt arrangement. The Applicant submits that this is different from the present invention where a projection is used to engage a groove. Accordingly, the Applicant submits that claim 7 is allowable over this three way combination of references. Further, claim 7 is allowable based on its dependency from allowable claim 1.

The Applicant has also added new claim 10 which further specifies the four brushes and their purposes. This is clearly not seen in any of the references. Independent claim 11 which has also been added describes the four brush cages and the end cap in a different manner than that in claim 1 but which is of substantially similar breadth. This claim is also allowable since the references do not show the brush cages with the first and second being integrally molded and the third and fourth being fixed to the end cap. Accordingly, the Applicant submits that claim 11 is also allowable. New claim 12 is similar to original claim 3 and further describes the angular spacing and is also allowable for the reasons recited above in regard to claim 3.

As pointed out above, the end cap assembly of the present invention is valuable because it is a standardized part which can be used for any of the three different types of motors simply by adding the two brush assemblies onto the brush part in a very simple manner. Since the inner part of the end cap assembly has a space for the brush cages when required, it is simple to add the cages and adjust their position according to the performance requirements of the completed motor. This arrangement also allows simple ultrasonic welding to be used to keep the third and fourth brush cages in their position, while the detents help to locate the cages radially. This arrangement is advantageous from a

manufacturing point of view and accordingly is a valuable and non-obvious arrangement.

Conclusion

In view of the above remarks, it is believed that the claims clearly distinguish over the patents relied on by the Examiner, either alone or in combination. In view of this, reconsideration of the rejections and allowance of all the claims are respectfully requested.

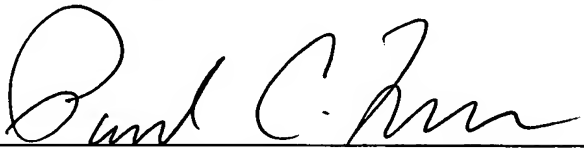
Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert F. Gnuse (Reg. No. 27,295) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.


Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By


for Joe McKinney Muncy, #32,334
#43,368

P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000

 KM/RFG/ndb
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